



Bachelor of Science/ Bachelor of Computing and Mathematical Sciences (BSc)/(BCMS) Computer Science



What is Computer Science?

Computer Science deals with the theory, design, analysis, implementation, efficiency and application of processes that transform information. The fundamental question underlying all of computer science is, "What can be automated?" Computer use in entertainment, industry, business, education and government is widespread, and the need for qualified professionals with a computing background continues to grow.

Computer Science majors learn about software systems and how people and computers interact. You'll learn how to create new software, how to ensure that the software works well and does what it's supposed to, and how to make that software easy for people to use.

Career opportunities

(Salary ranges are taken from the 2005 Absolute IT survey of IT salaries in New Zealand).

- ✔ **Computer Network Administration:** design, install, and support an organization's local networks and connection to the Internet. Network administrators maintain network hardware and software, analyze problems, and monitor the network to ensure that it is available to users. \$45K – 80K per year.
- ✔ **Database Administration:** decide what data is to be stored for an organization, and how to store it. A database administrator helps people to find the data that they need, while also protecting data privacy and security. \$45K – 95K per year
- ✔ **Software Development:** create new software and modify existing software systems. A software developer will write, test, and debug new computer programs. \$60K – 80K per year.
- ✔ **Systems Analysis:** design computer systems and create business solutions for large organizations such as banks, insurance companies and government departments. A Systems Analyst will investigate a business problem in detail, and create designs for a computer system or business approach to solve that problem. \$51K – 90K per year.

Some reasons for studying Computer Science

- ✔ Gain a qualification that will let you enter the IT world – a fast-growing, highly-paid field.
- ✔ Learn to use cutting-edge technologies to solve real world problems.
- ✔ Develop teamwork skills and friendships while working on group projects with other computing students.
- ✔ Use your Computer Science degree in your Overseas Experience – travel the world doing well-paid consultancies.

Computer Science degrees at Waikato University

The BCMS (Bachelor of Computing and Mathematical Sciences) is New Zealand's only computer science degree that is taught over four years. That extra year gives you the chance to drill more deeply into your specialist area. It is highly practical: you'll begin working in our excellent computing labs as soon as your first semester begins.

Because the first three years of the BCMS are identical to the Bachelor of Science (BSc), you can choose when you graduate. You have the option to graduate after three years with a BSc in Computer Science, or stay on for an extra year and complete your BCMS.

Within the Computer Science major, there are several specialisations available. These specialisations will equip you with the skills you need to succeed in careers in those areas of the IT industry. They are regularly updated to meet the changing needs of industry.

Specialisations:

- ✔ Artificial Intelligence
- ✔ Data Mining
- ✔ Graphics and Multimedia
- ✔ Information Systems
- ✔ Software Development
- ✔ Internet Applications



Background required

Our first year papers do not require any previous experience with programming, although prior familiarity with computers is helpful. Since you will study Intro to Algebra and Intro to Statistics, you will need a reasonable mathematics result at NCEA Level 3 (or its equivalent).

If you wish to major in Computer Science (BCMS, BSc), you must study:

First year:

COMP103 Intro to Computer Science 1
COMP104 Intro to Computer Science 2
MATH102 Intro to Algebra
STAT121 Intro to Statistical Methods

Second year and beyond:

At the second year you will continue gaining a firm grounding in the fundamentals of computing. You will gain more experience in programming, learn how computers and networks function, and study the logic and mathematical theory of computation.

At the second year you'll also begin studying courses specific to your specialisation. We have a wide range of papers available at the second and third year, including databases, computer graphic design, and internet applications. You'll have the chance to learn at least two programming languages, and how to work with the Windows and Linux operating systems.

By your third year, you'll be ready to tackle much larger projects. Two popular third year courses give you the experience of working in a team of four to six students, to create a significant software prototype. You'll go through the software development cycle, from deciding what type of software your client needs, to coding and testing your software design.



In your fourth year, you have the opportunity to undertake a major research project. You can work with one of our internationally recognized research groups, to push the frontiers of knowledge in your chosen specialisation. Past fourth year students have created new computer networks hardware and software, developed cryptography techniques, and developed algorithms and software to transform data to knowledge. You'll also be able to take advanced courses within your specialisation – to see work at the cutting edge of computing.

"When I was looking at universities, Waikato stood out in Computer Science. No other university offered a Computer Science specific degree. There was no doubt in my mind that Waikato was the one for me. The Bachelor degree at Waikato provides you with a high level of expertise. Many of my colleagues have to go to training courses, but thanks to my degree I can pick it all up straight away."

**– Kathryn Hempstalk, BCMS (Hons), Software Developer,
Ballance Agri-Nutrients Ltd**

"I had a fantastic time studying at Waikato. Human computer interaction is what I'm most interested in, but I went into the course not knowing exactly what I wanted to do within that field. The most important thing I've learned is that you need to enjoy what you do. In a degree there is always some pain along the way, but if you are interested in what you're studying, overall you'll have a good time."

The best recommendation for Waikato that I can give is that I'm not the only person who had a great time there. Every one of my friends had a tough time leaving, whether they were studying English, marketing, or computers. I'm really enjoying what I'm doing now, but I'd still love to turn back the clock and live the experience again."

– Nigel Warren, MCMS, Usability Analyst for Google



Genevieve Clark, BSc

Business Analyst – Orion Systems

In my first year I really enjoyed the introductory programming stuff, but quickly found I was more suited to the business/project rather than the technical side of things. That's why I chose the Information Systems specialisation. I think the mix of classes – including basic programming, database systems, computer architecture, philosophy and systems analysis and design – was an extremely good foundation for the role I ended up in with Orion Systems.

I was recruited straight out of Waikato University by Orion, who are a New Zealand company based in Auckland. Over the last few years they've opened offices in Australia, the UK, Canada and the US. I started off working as an Implementation Consultant but quickly moved into the role of Business Analyst. I actually use a lot of the UML and other techniques I learned at uni! I think the Information Systems specialization gave me quite a good base for this type of role – practical experience with systems design and thinking, but also technical skills as well.

I made some very good friends during my time at Waikato Uni – all of whom have gone on to be successful computer geeks in their chosen areas too. It's really great to see so many of us doing so well, all from the same BSc / BCMS background.

Contact Details

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